

# Life at the Top of the Food Chain: Seabirds, Seals and Whales as Sentinels of Environmental Contamination in Puget Sound and Georgia Basin

*Peter S. Ross*

*Institute of Ocean Sciences*

## **Abstract**

Wildlife occupying high levels in aquatic food chains often accumulate high concentrations of persistent organic pollutants (POPs), including polychlorinated biphenyls (PCBs) and other endocrine disrupting compounds. Such species have therefore been used to provide information on the “state of contamination in the environment”, reflecting their effective integration of contaminant signals from the food web upon which they depend. The heavy contamination of Pacific killer whales with PCBs, for example, have provided evidence that British Columbia and Washington State are not immune to problems of industrial contamination. In an ecosystem-based approach to modelling PCBs in this transboundary environment, high trophic level wildlife offer several key features that bear consideration: high trophic level, long lifespan, and a reasonable assessment of population numbers, life histories and prey composition. In addition, seabirds and marine mammals often share ecological features with certain human consumer groups (e.g. subsistence or fishing communities). Marine mammals, in particular, are understandable (and appealing) to members of the public and to managers. Questions demanding scrutiny include food web structure, quality of dietary information, linkages to abiotic components, life history characteristics (age, sex, size, condition, season, population, longevity, reproductive output), migratory habits of the species in question and their prey, and metabolism. Documenting the relative importance of ‘local’ vs ‘external’ contamination will require an understanding of the biological movement of predator and prey, and air and water masses, across any boundaries designated for this basin-oriented model. The scientific and ecological utility of the information generated from studies of seabirds and marine mammals, coupled with the potential for outreach, ensures that high trophic level organisms represent a valuable component of characterizing contaminant pathways in Puget Sound and Georgia Basin.